MÜLLER ELEKTRONIK

Installation and Operating Instructions

Spraylight

Version: V5.20150204

30283305-02-EN

Read and follow these operating instructions.

Keep these operating instructions in a safe place for later reference.

Company details

Document

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1 For your safety

1.1 Basic safety instructions

Please read the following safety instructions carefully before using the product for the first time.

- Never remove any safety mechanisms or stickers from the product.
- Read the operating instructions to the agricultural device which you want to control by using the product.
- Before servicing or repairing the tractor, always disconnect the tractor from the Spraylight terminal.
- Before charging the tractor battery, always disconnect the connection between the tractor and the terminal Spraylight.
- Before performing any welding operations on the tractor or a trailed machine, always disconnect the power supply to the Spraylight terminal.
- The product does not include any user serviceable parts. Do not open the casing.
- Do not make any unauthorized modifications to the product. Unauthorized modifications or use may impair safety and reduce the service life or operability of the unit. Modifications are considered unauthorized if they are not described in the product documentation.

1.2 Layout and meaning of warnings

All safety instructions found in these Operating Instructions are composed in accordance with the following pattern:

⚠ WARNING

This signal word identifies medium-risk hazards, which could potentially cause death or serious physical injury, if not avoided.

⚠ CAUTION

This signal word identifies low-risk hazards, which could potentially cause minor or moderate physical injury or damage to property, if not avoided.

NOTICE

This signal word identifies actions which could lead to operational malfunctions if performed incorrectly.
These actions require that you operate in a precise and cautious manner in order to produce optimum work results.

There are some actions that need to be performed in several steps. If there is a risk involved in carrying out any of these steps, a safety warning will appear in the instructions themselves.

Safety instructions always directly precede the step involving risk and can be identified by their bold font type and a signal word.

Example

1. NOTICE! This is a notice. It warns that there is a risk involved in the next step.
2. Step involving risk.

1.3 Intended use

Spraylight is intended exclusively for use in agriculture as well as in wine-growing, fruit-cultivating, and hop-growing operations. The manufacturer cannot be held responsible for any installation or use of the system that deviates from or exceeds the scope of intended use.

The manufacturer cannot be held liable for any personal injury or property damage resulting from such improper use. All risk involved during improper use lies with the user.

Intended use also includes the adherence to the conditions for operation and repairs prescribed by the manufacturer.

All applicable accident prevention regulations and all other generally recognised safety, industrial, and medical standards as well as all road traffic laws must be observed. Any unauthorized modifications made to the equipment will void the manufacturer's warranty.

1.4 User requirements

- Learn how to operate the terminal correctly. The terminal must not be operated by anyone who has not read the Operating Instructions.
- Please read and carefully observe all safety instructions and warnings contained in these Operating Instructions and in the manuals of any connected vehicles and farm equipment.

1.5 EC declaration of conformity

This product has been manufactured in conformity with the following national and harmonised standards as specified in the current EMC Directive 2004/108/EC:

- EN ISO 14982

2 About these Operating Instructions

2.1 Target group of these Operating Instructions

This operating manual is aimed at users of Spraylight.

2.2 Layout of operating instructions

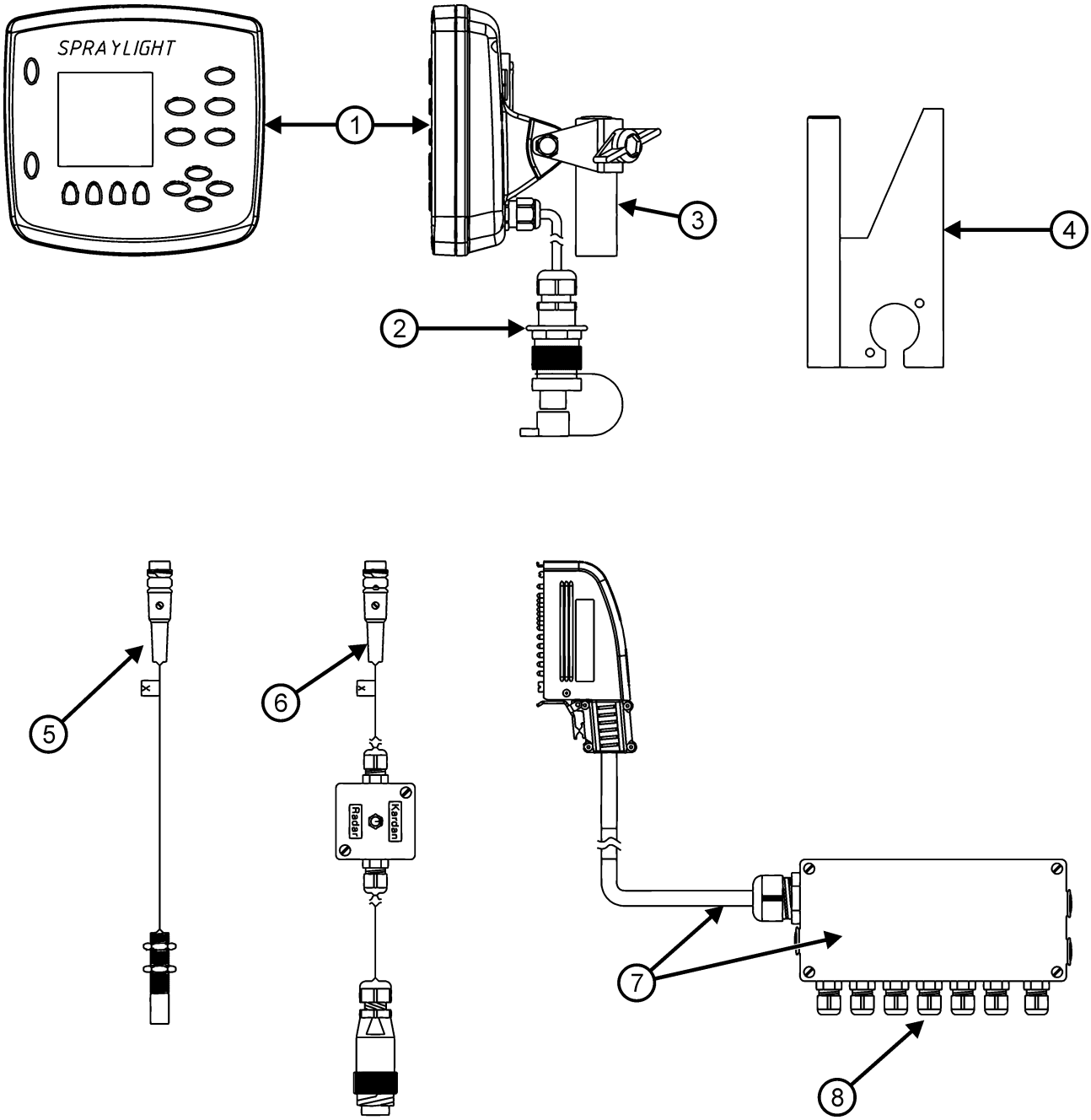
The operating instructions explain step by step how you can perform certain operations with the product.

We use the following symbols throughout these Operating Instructions to identify different operating instructions:

Type of depiction	Meaning
1. 2.	Actions that must be performed in succession.
⇨	Result of the action. This will happen when you perform an action.
⇨	Result of an operating instruction. This will happen when you have completed all steps.
☑	Requirements. In the event that any requirements have been specified, these must be met before an action can be performed.

3 Mounting and installation

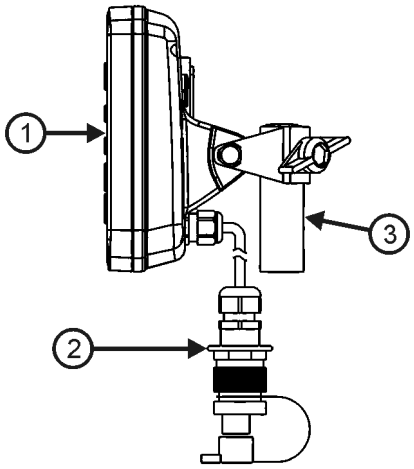
3.1 System overview



Spraylight - System overview

①	Terminal / on-board computer Included in scope of delivery	⑤	Wheel sensor (Sensor X) Available for order Item no.: 312084
②	Voltage connection cable Included in scope of delivery	⑥	Adapter cable for signal socket ISO11786 Available for order Item no.: 312120
③	Bracket for computer Included in scope of delivery	⑦	Distributor with connector cable Available for order 6.5m cable – Item no.: 30221071 10m cable - Item no.: 30221076
④	Mounting bracket Available for order Item no.: 312075	⑧	Cable glands for connecting sections, bypass, regulation, sensors

3.2 Mounting the terminal



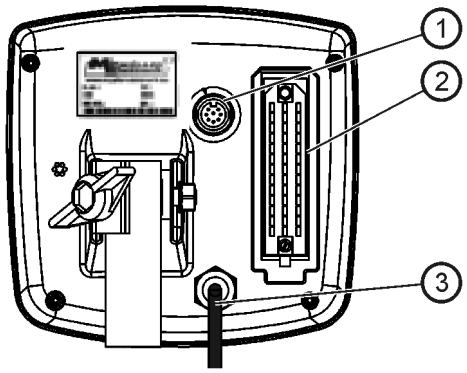
Mounting the terminal

①	Terminal / On-board computer	③	Bracket for mounting the terminal
②	Voltage connection cable Power connection cable with 3-pin connector plug.		

Procedure

1. Screw the bracket ③ to the computer ①.
2. Fasten the bracket with the terminal in the cab of the tractor.
   NOTICE! The distance to the radio device or to the radio antenna must be at least one metre.
   A mounting bracket can be used to fasten the bracket in the cab.
3. Connect the terminal with the distributor.
4. Connect the power connection cable ② to the battery connection cable.

3.3 Connecting the cable



Connections

1	8-pole flange socket For connecting the wheel sensor. Only for use when the wheel sensor cannot be connected to the distributor.	3	Voltage connector cable For connecting to the battery connector cable.
2	39-pole clip connector For connecting the distributor.		

Procedure

1. Connect the wheel sensor to the 8-pole flange socket (1).
   Only for use when the wheel sensor cannot be connected to the distributor.
2. Connect the distributor to the 39-pole clip connector (2).
3. Connect the voltage connector cable (3) with the battery connector cable.

3.4 Connecting the battery connection cable

When connecting the battery connection cable, read the instructions supplied with this cable.

3.5 Installing the wheel sensor

A wheel sensor (also called Sensor X) is a sensor that determines the speed of the vehicle and transmits it to the Spraylight.

The wheel sensor consists of a sensor and multiple magnets.

The magnets are mounted at regular intervals onto the rim or drive shaft of the tractor. The wheel sensor is mounted onto the king-pin bearing. When the rim or drive shaft rotate, the magnets rotate with them.

The sensor sends a pulse to a job computer or an on-board computer every time that a magnet passes in front of it.

The software calculates the current speed on the basis of the number of pulses within a defined period.

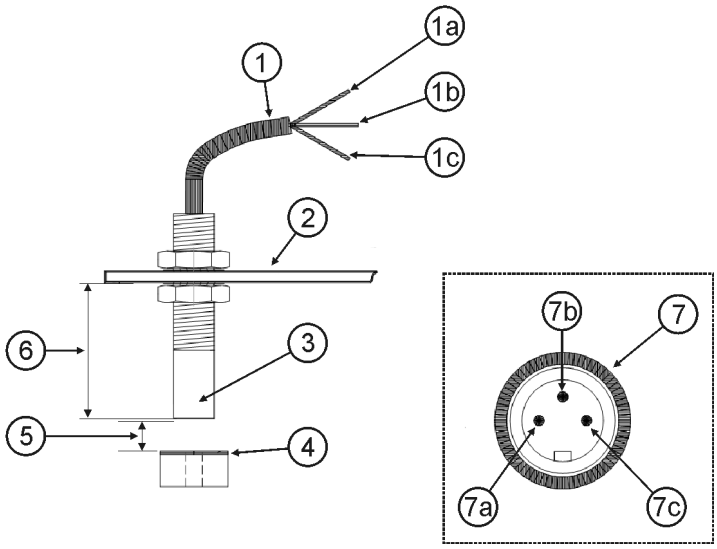
You can mount the wheel sensor in the following positions:

- On the rim of the towed machine
- On the front wheel of the tractor
- On the drive shaft of a tractor with all-wheel drive

3.5.1 Mounting the wheel sensor on the rim

The wheel sensor should be mounted on the rim in the following instances:

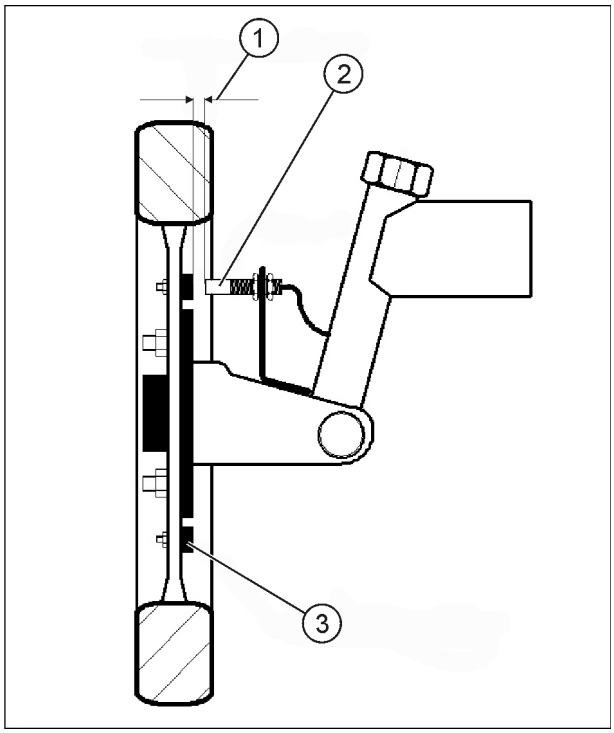
- For a trailer-sprayer – on the rim of the trailer-sprayer.
- For a mounted sprayer and tractor with no all-wheel drive – on the front wheel of the tractor.



Mounting the wheel sensor on the rim

1	Cable to 3-pole plug	5	Switching distance Must be 5 to 10 mm.
1a	White color: Ground	6	Distance from the angle bracket to the end of the sensor Must be at least 25 mm.
1b	Brown color: +12 Volt	7	3-pole plug – Pin assignment (optional)
1c	Green color: Wheel	7a	White color: Ground
2	Mounting angle	7b	Brown color: +12 Volt
3	Wheel sensor with a blue cap	7c	Green color: Wheel
4	Magnet with a red cap Mount in an anti-magnetic manner.		

The following illustration shows the position of the wheel sensor and the magnet on the rim:



Position of the wheel sensor and magnet on the rim

1	Switching distance 5-10 mm	3	Magnet
2	Wheel sensor		

Procedure

1. Calculate the number of magnets required.
   The number of magnets is dependent on the size of the wheel.
   The distance traveled from pulse to pulse must not exceed 60 cm.
   Calculation:
   Wheel circumference ÷ 60 cm = number of magnets
   e. g.:
   256 cm ÷ 60 cm = 4.27 = min. 5 magnets
2. Mount the magnets on the wheel shell with the V4A screws provided.
   The magnets must be distributed equally around the circumference of the rim.
3. Mount the wheel sensor onto the king-pin bearing using the bracket provided. The end of the sensor must point to the magnets.
   The distance between the sensor and the magnets must be between 5 -10 mm.
   The following illustration shows the position of the sensor and the magnets:
4. Connect the wheel sensor electronically:
   You can do this in the following ways:
   - If you mounted the wheel sensor on the trailer-sprayer, connect the wheel sensor to the distributor. Use the 39-pole plug.
   - If you mounted the wheel sensor on the tractor wheel, connect the wheel sensor directly to the Spraylight. Plug the sensor's 3-pole plug into the 8-pole flange socket of the Spraylight.

3.5.2 Mounting the wheel sensor on the drive shaft

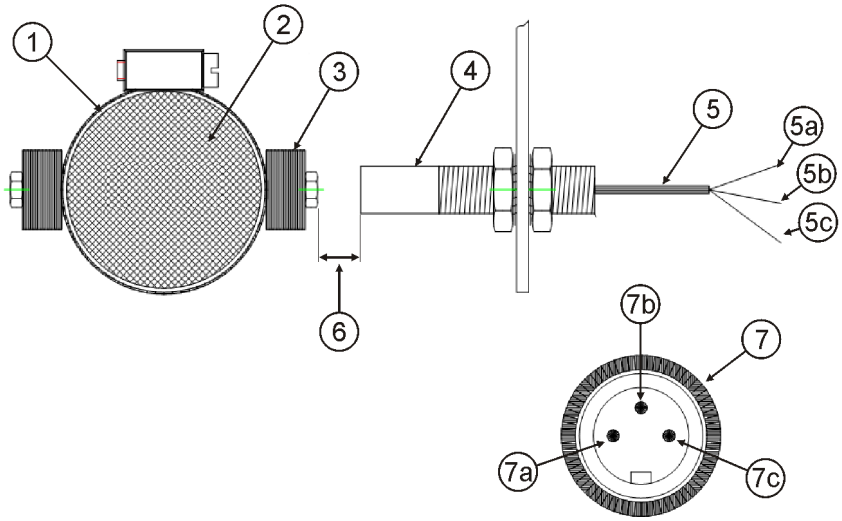
WARNING

Rotating machine parts
Risk of drawing-in and crushing injuries

- Switch off the motor before mounting the wheel sensor!
- Ensure that no one starts the motor while you are mounting the wheel sensor!

The wheel sensor should be mounted on the drive shaft in the following instances:

- On a mounted sprayer and tractor with all-wheel drive.



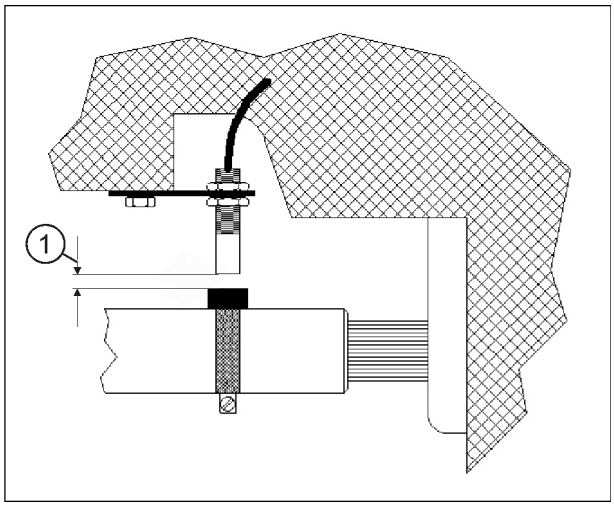
Mounting the wheel sensor on the drive shaft

1	Hose clamp with magnets There can be one or two magnets, depending on the design.	5c	Green color: Wheel
2	Drive shaft	6	Switching distance 5 to 10 mm
3	Magnet with a red cap Mount in an anti-magnetic manner.	7	3-pole pin – pin assignment (plug is optional)
4	Wheel sensor with a blue cap	7a	White color: Ground
5	Cable to 3-pole plug	7b	Brown color: +12 Volt
5a	White color: Ground	7c	Green color: Wheel
5b	Brown color: +12 Volt		

Procedure

1. Mount the hose clamp with magnet on the drive shaft.
2. Mount the sensor such that it is vibration-free.
3. The sensor must point towards the magnets at a distance of 5 - 10 mm.

The following illustration shows the position of the sensor and the hose clamp:



Position of the wheel sensor on the drive shaft

1	The distance between the sensor and the magnets must be between 5 and10 mm.

3.6 Determining speed by means of the tractor's signal socket

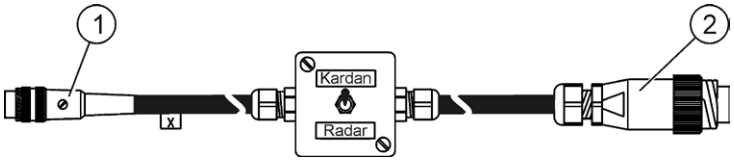
If your tractor is fitted with a signal socket and you have no wheel sensor, you can transmit the speed of the tractor by means of the signal socket to the Spraylight.

if you determine the speed by means of the tractor's signal socket, you will still need to determine the pulses per 100 m.

You may require an adapter cable to connect the Spraylight to the signal socket. This adapter cable can be ordered from Müller-Elektronik using Item no. 312120. The adapter cable can be connected to tractors from the following manufacturers:

- Fendt
- John Deere
- Deutz
- CLAAS

The following illustration is a diagrammatic representation of the cable:



Cable for connection to the signal socket [312120]

1	Cable to the computer, 3-pole	2	Cable to the signal socket, 7-pole

3.7 Connecting section valves

CAUTION

Damage to the implement caused by solenoid valves
If you use solenoid valves as section valves, the device will be damaged by over-current.

- Connect the system only to motorized valves.
- Pay attention to the maximum power consumption mentioned in the "Technical data [→ 57]" section.

3.8 Instructions on retrofitting

Instructions on how to retrofit electrical and electronic farm equipment and/or components

Agricultural equipment used today features electronic components and parts whose function can be affected by other farm equipment which emits electromagnetic waves. Such effects could lead to personnel being put in danger, if the following safety instructions are not adhered to.

Selecting components

When selecting components, make sure first of all that the retrofitted electrical and electronic components comply with the current version of the EMC Directive 2004/108/EC and carry the CE marking.

User responsibility

When retrofitting a machine with electrical and electronic farm equipment and/or components connected to the vehicle's electrical system, it is your own responsibility to check whether the installation causes interference with the vehicle's electronic system or other components. This applies, in particular, to the electronic control of:

- electronic hitch control (EHR),
- front linkage,
- power take off (PTO),
- engine,
- gear.

Additional requirements

The following requirements must be met in order to retrofit mobile communication systems (e.g. radio, phone):

- All farm equipment must be approved and installed in accordance with the regulations applicable in the respective country.
- The equipment must be installed as a fixed installation.
- The operation of portable or mobile farm equipment in the interior of the vehicle is only permitted via a connection to a permanently installed exterior antenna.
- The transmitting part must be spatially separated from the vehicle's electronic system.
- When attaching the antenna, pay attention to proper installation, including a sound ground connection between the antenna and the vehicle's ground wire.

For information on wiring and installation as well as the maximum allowable current consumption, please also refer to the installation guide provided by the machine manufacturer.

4 Product description

4.1 Performance description

Spraylight features the following functions:

- Up to seven section switches with main section switch
- Manual and automatic control of the application rate
- Up to four hydraulic functions
- Display of current speed
- Display of current application rate
- Display of remaining workable area
- Display of the current tank content
- Documentation of work results

4.2 Overview of keys

Front view of Spraylight

Controls

Buttons – Buttons always having the same function. Named 'buttons' from now.

	Switching on and off
MENU	Return to the work screen
	Access menu function icons
-10%	In Automatic mode: Reduce the set value by 10%
	In Manual mode: Reduce pressure
+10%	In Automatic mode: Increase the set value by 10%
	In Manual mode: Increase pressure
Auto	Switch between manual and automatic mode
	Switch section main switch on and off

	Switch between groups of function icons on the work screen
	Bring up work screen
+	In the menus – move the cursor up one line
	Increase the value by one during data input
−	In the menus – move the cursor down one line
	Reduce the value by one during data input
Esc	Exit screen
	Cancel data input
	Close a pop-up window
OK	Confirm data input

Function buttons – Buttons, the function and meaning of which depends upon the symbols (function symbols) displayed on the screen. Function buttons may have different functions in different screens. Named 'function buttons' from now.

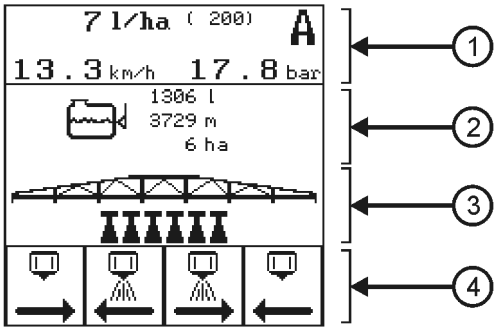
	Activate the functions represented by the function icons

4.3 Screen structure

4.3.1 Work screen with a sprayer

The work screen is always displayed during work and contains the most important information. The work screen informs you about the status of the connected machine during work.

The work screen is divided into four areas.

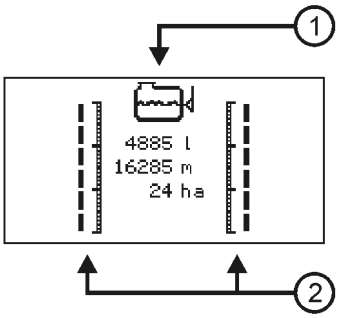


Work screen areas - sprayer

1	Spray data area	3	Boom display area
2	Tank display area	4	Function icons section

4.3.2 Work screen for an orchard sprayer

The only difference between the orchard sprayer work screen and the sprayer work screen are the boom display and tank display areas.



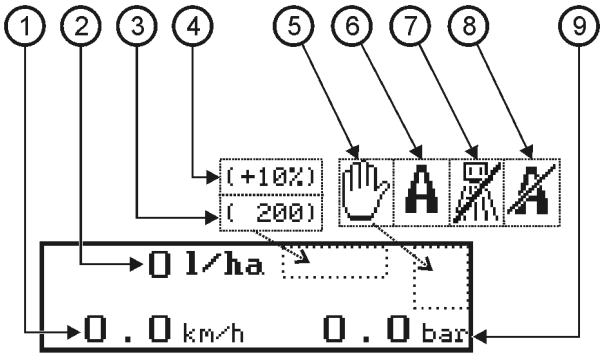
Work screen for an orchard sprayer

1	Tank display area	2	Boom display area

4.3.3 Areas on the work screen

Spray data area

The following information is shown in the Spray data area:



Spray data area

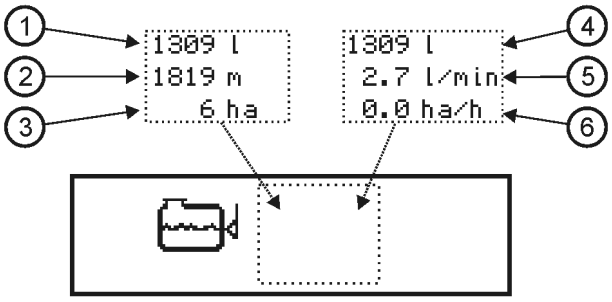
1	Speed Current sprayer speed in km/h.	6	Automatic mode Automatic mode is switched on.
2	Current value Current application rate in l/ha.	7	Sprayer off icon If this icon appears on the display, then a set value of 0 l/ha has been input, or the minimum working speed has been undercut.
3	Set value Preset application rate in l/ha.	8	Automatic mode off icon When this icon appears on the display, the current speed is lower than the Auto.speed and higher than the Min.Speed.
4	Percentage adjustment of the set value The set value can be adjusted in Automatic mode in 10% increments. The percentage figure is displayed approx. 2 seconds following the adjustment.	9	Spray pressure Current pressure of the sprayed liquid in bar (only when the pressure sensor is configured).
5	Manual mode Manual mode is switched on. The spray pressure must be adjusted manually.		

Tank display area

The Tank display area provides information which will help you assess the status of the tank.

The type of information shown changes every three seconds.

The following illustration shows the meaning of the information displayed.



Tank display area

1	Current tank content Depending on the spray equipment, this will show either the calculated or measured tank content.	4	Current tank content Depending on the spray equipment, this will show either the calculated or measured tank content.
2	Workable distance This distance can still be processed under the current conditions.	5	Flow rate per minute Flow rate through the main flow meter.
3	Workable area The area shown here can still be processed with the current tank content and the current application rate.	6	Area output / hour

Hydraulic valve icons may also appear in the Tank display area.

Read more about this in Chapter Working with hydraulic valves [→ 53].

Boom display area

In the boom display you find the following information:

- Number of sections
- Which sections have been selected or switched off
- Which sections are applying

Possible states

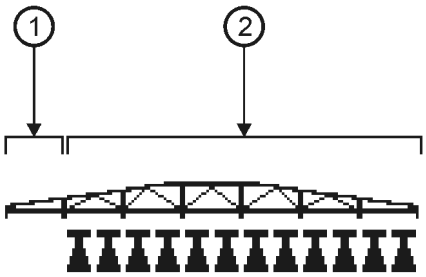
The sections can be in three states.

You can read a section's state in the work screen in the boom terminal area.

The following section status settings are possible:

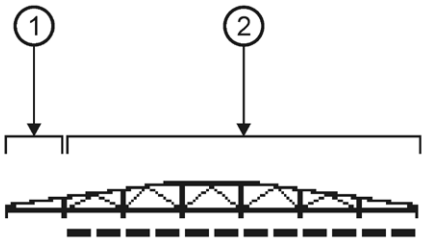
Display	Section status
	Section is switched off.
	Section is selected. Section is ready for application.
	Section is selected and the main section switch is switched on. Section is applying.

Example



Boom display area – example 1

1	Section 1 is switched off.	2	Sections 2 to 7 are selected and applying.



Boom display area – example 2

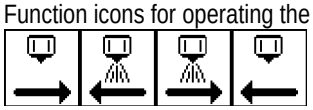
1	Section 1 is switched off.	2	Sections 2 to 7 are selected but are not yet applying.

Function icons section

The lower area of the work screen shows the function symbols. The lower area of the work screen shows the function symbols. With Spraylight, four function symbols can be shown simultaneously here.

There are three groups of function icons on the work screen:

- Function icons for operating the sections



- Function icons for menus

- Function icons for hydraulics (optional)

The number of hydraulic function icons displayed depends on the number of hydraulic valves that you have configured.

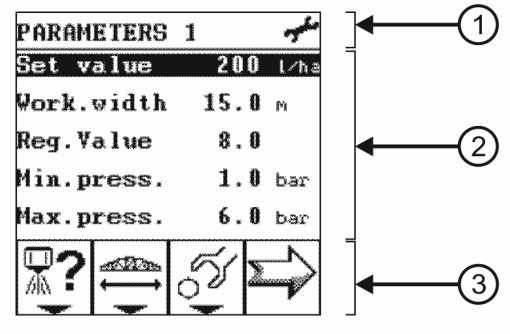
Controls

Switching between groups of function icons

4.3.4 Structure of further screens

In addition to the work screen, further screens are displayed with Spraylight.

These screens always consist of the following three areas:



Screen structure

1	Header area contains the designation of the displayed screen	3	Function symbol area Icons that can be pressed on this screen.
2	Screen content		

5 Basic control principles

5.1 Navigating in screens

5.1.1 Browsing between screens

There are screens that have too many entries to display them all on one screen. In these screens you may need to browse further.

Controls

The following function icons tell you that you can browse further in a screen. You can press the associated function button to browse further.

Browse to the next screen

5.1.2 Exit screen

Exiting the data input screen will cancel the data input.

You can exit a screen in the following ways:

Controls

Esc Exit screen

MENU To switch to the work screen (does not work on data input screens)

5.1.3 Moving the cursor

On many screens, you can select individual lines to change their value.

Controls

Move the cursor up one line

Move the cursor down one line

OK Confirm your choice

5.2 Selecting and activating parameters

Marking a parameter with your cursor and pressing OK gives you the following options depending on the parameters:

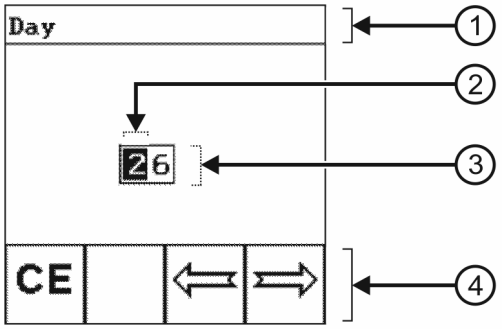
- Input data
- Activate or deactivate function.

5.2.1 Inputting data

Data is always input in the same way, and you can do this on the Data input screen.

The data input screen always appears when you use the OK key to activate a parameter for which you can input data.

Data input screen



Data input screen

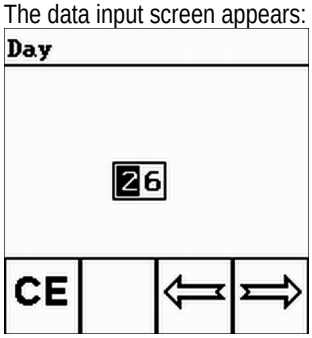
1	Header area Contains the name of the parameter whose value is being input.	3	Input field Contains number fields for entering the value.
2	Cursor Marks the number which can be modified.	4	Function icons

Controls

⇦	Move cursor to the left
⇨	Move cursor to the right
CE	Set all numbers to 0
+	Increase marked number by one
−	Decrease marked number by one
OK	Confirm data input and finish
Esc	Cancel data input

Procedure

1. Make sure that you have called up the data input screen!
2. The data input screen appears:



3. ⇦ ⇨ - Move the cursor to the desired point.
4. + − - Set the desired number.
5. ⇦ ⇨ - Move the cursor to the desired point.
6. + − - Set the desired number.
7. OK - Confirm and finish input.

⇨ The new value is accepted by the Spraylight.

5.2.2 Activating and deactivating functions

You can activate and deactivate certain functions on the Spraylight.

You can recognize these functions with the following icons:

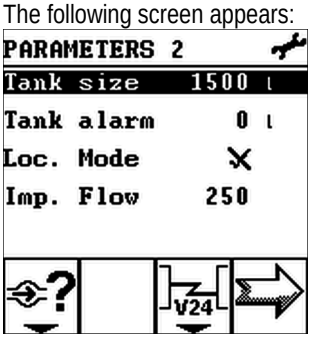
☑ - Function is activated

☒ - Function is deactivated

Procedure

1. Switch to the Parameter No. screen:
   For example:

   ⇨ The following screen appears:

2. - Highlight the line with the name of the function.
3. - Activate or deactivate function.

⇨ The icon beside the parameter changes.

6 Preparing Spraylight for use

After you have connected all components of the system, you must configure Spraylight and the connected components.

To configure the system, you must carry out the following:

- Enter the machine parameters
- Calibrate the sensors
- Set limit values for spray pressure (Min. pressure and Max. pressure)
- Configure Automatic mode

Read the chapter below to find out more about this.

6.1 When should you configure what?

The following table shows an overview of the configurable functions and when these functions must be configured:

When should you configure what?

Function	Initial start-up	Start of season	In other instances
Language	●		
Date / time	●		Changing the clocks. After more than two weeks without power.
Working width	●		Changing the working width
Nozzles per section	●		Changing the number of nozzles in a section
Tank size	●		Changing the tank size
Tank alarm	●		
Calibrating the flow meter	●	●	Displayed spray pressure is incorrect
Calibrating the wheel sensor	●	●	Displayed speed differs from actual speed.
Min.press.	●		
Max.press.	●		
Min. Speed	●		
Auto.speed	●		
Reg.Value	●		The controls are too slow or too sensitive.

6.2 Configuring the basic settings of the on-board computer

To configure the basic settings, you must carry out the following:

- Select the language
- Set contrast and brightness
- Set date / time

The following sections contain detailed instructions.

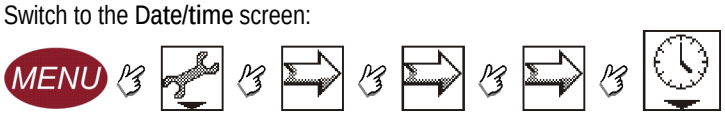
6.2.1 Setting date / time

When to enter?

- Prior to initial startup.
- When Spraylight has had no power supply for more than two weeks.

Procedure

1. Switch to the Date/time screen:



⇨ The following screen will appear:

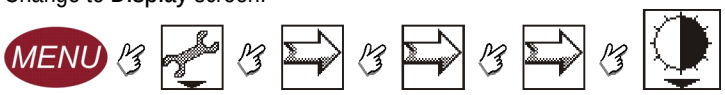
2. Modify the required parameters.

⇨ The new date and time appear on the screen Parameter 4

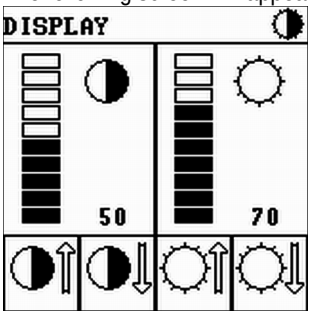
6.2.2 Setting contrast and brightness

Procedure

1. Change to Display screen:



⇨ The following screen will appear:



2. Configure the screen via the following function buttons:

- Increase contrast

- Reduce contrast

- Increase brightness

- Reduce brightness

3. Esc - Exit screen.
   ⇨ The modifications are adopted.

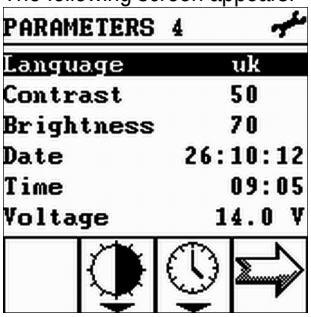
⇨ You have adjusted contrast and brightness of the screen.

6.2.3 Selecting language

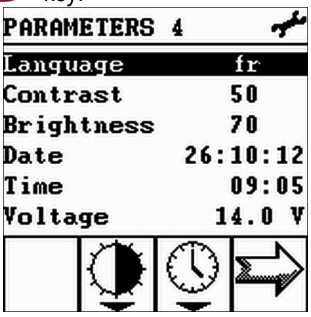
Procedure

1. Switch to the Parameters 4 screen:

   ⇨ The following screen appears:



2. OK - Select a language.
   A new language abbreviation is shown in the Language line every time that you press the OK key.



   ⇨ Continue to press the key until the abbreviation for the desired language appears.

3. MENU - Confirm.
   ⇨ The terminal restarts.

⇨ The language of the terminal then changes.

6.3 Entering sprayer parameters

if you have connected the Spraylight to the sprayer, you must input the sprayer parameters.

6.3.1 Entering sprayer working width

When to enter?

- Prior to initial startup.
- When there is a change to the sprayer's working width.

Saving working widths

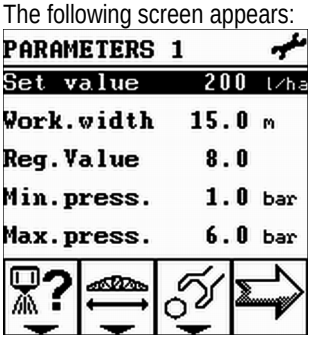
You can save multiple working widths in Spraylight and then select the required one.

Procedure

To save multiple working widths:

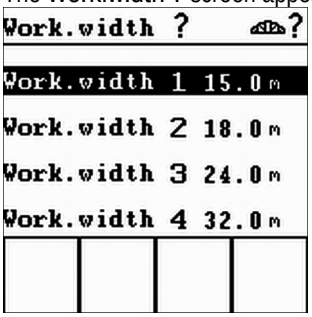
1. Switch to the Parameters 1 screen:

   ⇨ The following screen appears:

2. - Highlight the Work.width line.
3. - Press

   ⇨ The Work.width ? screen appears:

4. Mark one of the four positions.
5. - Confirm.

   ⇨ The data input screen appears.

6. Input a working width.
7. - Exit the screen.

   ⇨ The Work.width ? screen appears.

8. - Exit the screen.

   ⇨ The Parameters 1 screen appears.

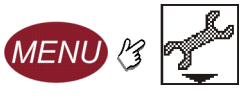
⇨ You have saved a working width.

Selecting a working width

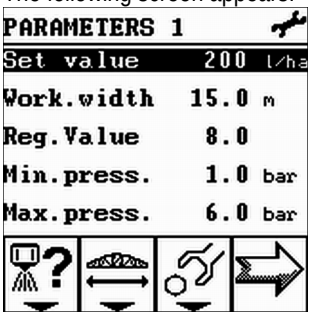
Procedure

To select a saved working width:

1. Switch to the Parameters 1 screen:

⇨ The following screen appears:



2. - Highlight the Work.width line.
3. - Press to select another working width.
   ⇨ Every press of the key displays a different working width beside the parameter Work.width.

⇨ You have selected a working width.

6.3.2 Entering the number of nozzles per section

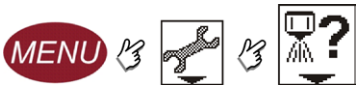
You must enter the number of nozzles installed on each section.

When to enter?

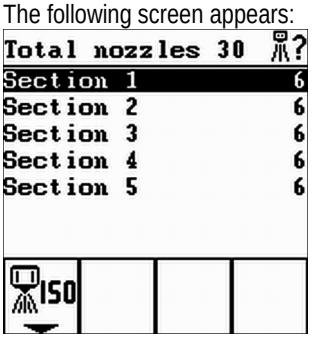
- Prior to initial startup.
- When the number of nozzles in a section changes.

Procedure

1. Switch to the Total nozzles screen:

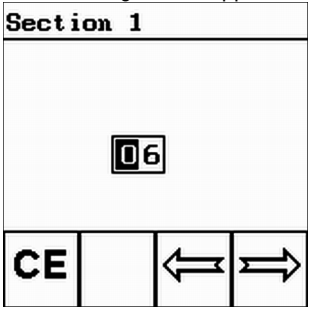
   

   ⇨ The following screen appears:



   The total number of nozzles is given in the header.
   The numbers of the working widths are listed from left to right. Section 1 is the first section on the left-hand side of the boom.

2. - Select the desired section.
3. - Confirm.
   ⇨ The following screen appears:



4. Input the number of nozzles in the section in the Section screen.
5. OK - Confirm.

⇨ The new number of nozzles will be shown on the Total nozzles screen.

6.3.3 Configuring the nozzle type

When using the Spraylight, you have the option to configure the type of nozzles which are mounted in a section.

You can thus:

- Select the nozzle type.
- Calculate the output of the nozzles on your machine.
- Calculate the amount applied by the nozzles over a defined area.

Selecting the type of nozzle

The nozzle choice list contains 14 standard nozzle types as defined by ISO 10625 and 4 user-specific, freely configurable nozzles types A, B, C and D.

The following table shows an overview of the nozzles, their color and output:

Nozzle color in accordance with ISO 10625	ISO identifier	Output in l/min. at 3 bar
light violet	0050	0.2
light pink	0075	0.3
orange	01	0.4
green	015	0.6
yellow	02	0.8
violet	025	1.0
blue	03	1.2
purple	035	1.4
red	04	1.6
brown	05	2.0
grey	06	2.4
white	08	3.2
light blue	10	4.0
light green	15	6.0

Nozzle color in accordance with ISO 10625	ISO identifier	Output in l/min. at 3 bar
Nozzle A	-	Specific
Nozzle B	-	Specific
Nozzle C	-	Specific
Nozzle D	-	Specific

Procedure

1. Switch to the Nozzle choice screen:

⇨ The following screen appears:

2. - Highlight the Noz. (nozzle color) line.
3. - Confirm.
4. The following screen appears:

On the screen you can see:
- The standardized color of the nozzle,
- The standardized output of the nozzle,
- The standardized ISO number of the nozzle.

5. Select the desired nozzle type.
6. Confirm your choice.
7. - Exit the screen.
   ⇨ The selected nozzle with the calculated application rate appears in the Nozzle choice screen.

⇨ You have selected a nozzle type.

You can now evaluate the output and amount applied by the selected nozzle under different conditions.

Calculating the output and amount applied by the nozzles on your machine

On the Nozzle choice screen, you can calculate how much you can apply with the selected nozzle. This calculation should help you find the nozzle that is appropriate for your task.

The screen includes three parameters which you can configure yourself. Your inputs for these parameters have no impact on the application. These values are used to calculate the application amount and nozzle output.

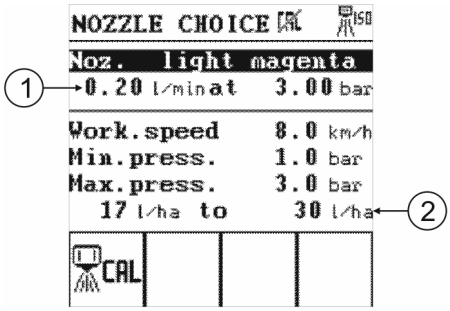
Parameters in the Nozzle choice screen:

- Working speed
- Minimum pressure value
- Maximum pressure value
  The pressure range defined by the pressure values should always be within the specification defined by the nozzle manufacturer.

In addition to these three parameters, the following parameters are taken into consideration when calculating nozzle output:

- Type of nozzle
- Working width of sprayer

The calculation results can be seen on the Nozzle choice screen:



Nozzle choice

1	Nozzle performance in liters per minute	2	Nozzle application amount in liters per minute

Procedure

1. Switch to the Nozzle choice screen:

   ⇨ The following screen appears:

2. - Mark the desired parameter.
3. - Confirm.
   ⇨ The data input screen appears.
4. Input the desired value for a parameter in the data input screen.
5. - Confirm.

⇨ The calculated output of the nozzle is shown on the Nozzle choice screen.

Calibrating non-ISO compliant nozzles

if you install a non-ISO compliant nozzle, or if you notice that your nozzles perform differently than that stipulated under ISO norms, you can re-calibrate the nozzles.

Procedure

1. Switch to the Nozzle choice screen:

2. Select the nozzle type. See Chapter Selecting the type of nozzle [➞ 31].
   Select one of the nozzles from types A, B, C or D.
3. CAL - Press.
   ⇨ The following screen appears:

4. Configure the nozzle. See the Table in these Operating Instructions.

Parameter	Meaning
Ref.Point1	Maximum output of the connected nozzle
at	Pressure when maximum output was measured
Ref.Point2	Minimum output of the nozzle
at	Pressure when minimum output was measured

Recalibrating a nozzle when worn

Even when you are using ISO-compliant nozzles, the output of the nozzle may change due to wear.

In this instance, you can calibrate an ISO nozzle and set a new output value.

Procedure

1. Switch to the Nozzle choice screen:

2. Select the nozzle type. See Chapter Selecting the type of nozzle [➞ 31].
   Select the nozzle that you want to calibrate.
3. CAL - Press.

⇨ The following screen appears:

4. Highlight the Ref.Point1 line.
5. Input the current output of the nozzle at 3 bar.
   You determine the output of the nozzle by measuring the applied amount from one nozzle in a single minute using a measurement cup at a pressure of 3 bar.
   ⇨ The following screen appears:

   The icon tells you that the selected nozzle was re-configured and is no longer ISO-compliant.

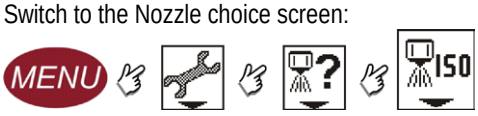
⇨ You have calibrated a nozzle.

Restoring factory settings

You can reset a newly calibrated ISO nozzle to its ISO settings.

Procedure

1. Switch to the Nozzle choice screen:



2. Select the nozzle type. See Chapter Selecting the type of nozzle [→ 31].
   Select a nozzle which you have calibrated to a new value and which you want to reset to its ISO settings.
   ⇨ The selected nozzle will appear on the "Nozzle choice" screen:

3. - Reset nozzle to ISO settings.
   If this function icon does not appear, the nozzle is already calibrated to be ISO-compliant.

⇨ The following screen appears:

⇨ You have reset the re-configured nozzle to its ISO settings.

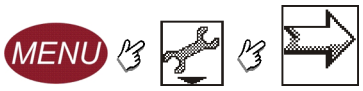
6.3.4 Inputting tank size

When to enter?

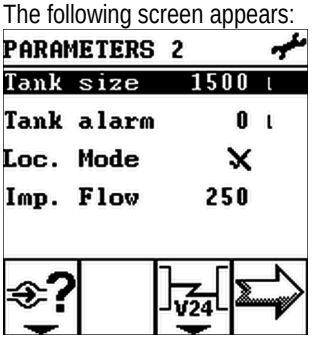
- Prior to initial startup.

Procedure

1. Switch to the Parameters 2 screen:



⇨ The following screen appears:



2. Input the size of your tank in the Tank size line.

⇨ You have input the tank size.

6.3.5 Setting a tank alarm

If the amount of spray fluid in the tank is lower than the value given here, the tank alarm is triggered:

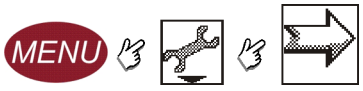
- A pop-up window appears.
- A beep sounds.

To deactivate this function:

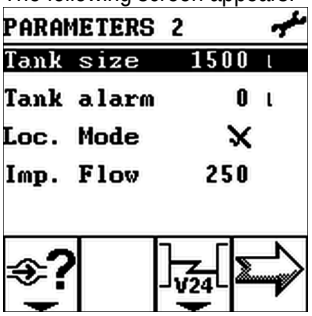
- Enter value 0 in the Tank alarm line.

Procedure

1. Switch to the Parameters 2 screen:



⇨ The following screen appears:



2. Input the amount to trigger the tank alarm when this amount is undercut in the Tank alarm line.

⇨ You have activated the tank alarm.

6.4 Tank filling

You must always input the amount poured in when filling the tank on the sprayer. This process is called: Tank filling.

There are two ways to fill the tank:

- Filling up the tank without TANK Control
- Filling up the tank with TANK-Control

6.4.1 Filling up the tank without TANK Control

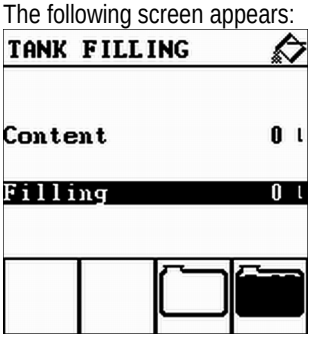
If you fill the tank without Tank Control, you must input the filled amount manually into Spraylight.

Preconditions

☑ You have input the tank size correctly.

1. Switch to the Tank filling screen:

⇨ The following screen appears:



The Content parameter gives the current content of the tank.

2. If the actual tank is empty, but Spraylight indicates that this is not yet empty, then set Content to 0

⇨ The Content parameter is set to 0 liters:

3. Fill the tank.
When filling the tank, you have the following options:
a) - At the terminal, input that the tank is now full.
b) - Activate the highlighted Filling line.
In the data input screen, input the amount which will be in the tank after filling.

4. The value of the Content parameter changes.

⇨ You have filled the tank.

6.4.2 Filling up the tank with TANK Control

TANK-Control is a measurement system that constantly measures and displays the tank content.

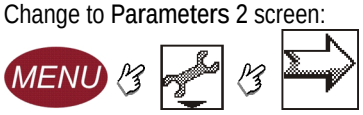
If TANK-Control is connected to the sprayer and is configured for use with TANK-Control, you need not enter anything when filling the tank.

Procedure

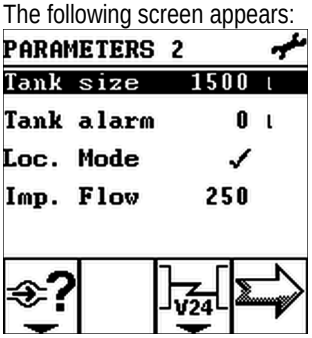
To activate TANK-Control:

☑ TANK-Control is connected.

1. Change to **Parameters 2** screen:



⇨ The following screen appears:



2. - Mark the **Tank-Control** line.
3. - Activate the **Tank-Control** parameter.

⇨ The ☑ icon will appear next to the **Tank Control** parameter.

⇨ TANK-Control is activated.

6.5 Calibrating the flow meter

When should you calibrate?

Because the number of pulses per liter can change during the lifespan of a flow meter, calibration must be carried out in the following cases:

- Prior to initial startup.
- At the start of each season.
- When you detect deviations between the amount actually sprayed and the amount displayed.
- When you have replaced or repaired the flow meter.

Methods

There are two ways you can calibrate the flow meter:

- The tank method – it is time-consuming, but precise.
- The nozzle method – it is not as precise as the tank method, but is less time-consuming.

NOTICE

Imprecise calibration

If the calibration is imprecise, the calculations will be very inexact and the application imprecise.

- Calibrate the flow meter very precisely.

6.5.1 Calibrating the flow meter with the tank method

Mode of operation

In the tank method a large quantity of water will be sprayed from the tank over a specific time.

The flow meter measures the pulses during this time.

After the application, you must enter the quantity of water that has been sprayed.

The computer works out the number of pulses per liter.

Preconditions

☑ All sections are selected.

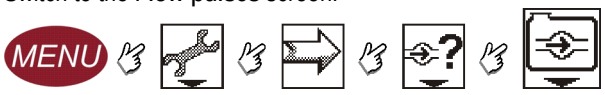
☑ Manual mode is activated (the icon appears on the work screen).

☑ You have filled the tank with clean water. For this you need several hundred liters of water.

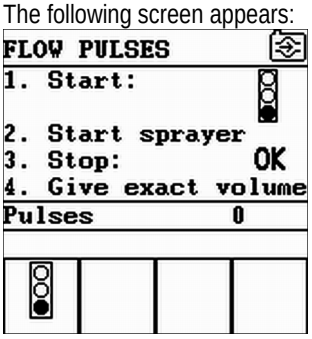
☑ You have the option of weighing the entire trailer or measuring the volume of water applied with another method.

☑ Pump is switched on.

1. Make sure that all preconditions are fulfilled!
2. Switch to the **Flow pulses** screen:

   ⇨ The following screen appears:

3. - Start calibration.
   ⇨ The following function icons appear:
   OK - Stop calibration.
   ESC - Abort calibration.
4. - Start application.
   ⇨ During application, the number of pulses is counted on the **Flow pulses** screen.
5. Wait until a few hundred liters have been applied.
6. - Stop applying.
   ⇨ The application will be stopped.
   ⇨ No pulses are counted on the display.
7. OK - Stop calibration.
   ⇨ The highlighted **Volume** line appears in the **Flow pulses** screen.
8. Determine the quantity applied.
9. Check that the **Volume** line is highlighted.
10. - Select the Volume line.

⇨ The data input screen appears.

11. Input the amount applied in liters.
12. OK - Confirm.
13. Esc - Exit the screen.

⇨ You have calibrated the flow meter with the tank method.

6.5.2 Calibrating the flow meter with the nozzle method

When calibrating the flow meter using the nozzle method, you determine the average quantity of the liquid applied through a nozzle in a specific time.

Mode of operation

When calibrating using this method, you must apply clean water over the entire working width and measure the applied quantity on different nozzles using a measuring cup.

The flow meter measures the pulses during this time.

When you have finished the application, you must enter how much water was applied on average by one nozzle in one minute.

The computer works out the number of pulses per litre.

Preconditions

☑ You have prepared a measuring cup you can use to measure the quantity sprayed.

☑ You have prepared a stopwatch to be able to count one minute precisely.

☑ All of the sections are open, and the sprayer can apply over the entire working width.

☑ Manual mode is activated (the icon appears on the work screen).

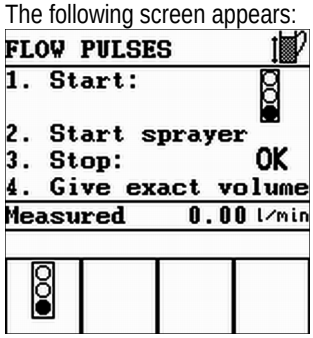
☑ The tank is filled with clear water.

☑ The set working width is correct.

☑ The number of nozzles per section and the number of sections are entered correctly.

1. Ensure that all prerequisites have been fulfilled.
2. Switch to the Flow pulses screen:

⇨ The following screen appears:



3. - Start calibration.

⇨ The following function icons appear:

OK - Stop calibration.

ESC - Abort calibration.

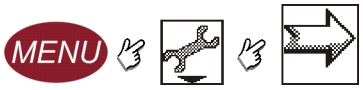
4. - Start application.
   ⇨ During application, the number of litres applied per minute is counted on the Flow pulses screen.
5. Go to one nozzle and for 60 seconds carefully collect the water sprayed by using the measuring beaker prepared. Write down the quantity.
   We recommend that you count the average from multiple nozzles.
6. - Stop applying.
   ⇨ The application will be stopped.
   ⇨ No further litres are counted on the display.
7. - Stop calibration.
   ⇨ The volume line appears on the Flow pulses screen.
8. - Select the Volume line.
   ⇨ The Volume screen appears.
9. Enter the average measured volume in litres.
10. - Confirm.
11. - Exit screen.

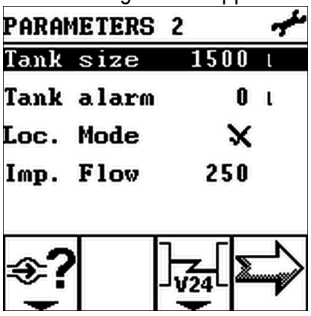
⇨ You have calibrated the flow meter with the nozzle method.

6.5.3 Manually entering the number of pulses per liter for the flow meter

If you know the precise number of pulses per liter for the flow meter, you can enter this value manually.

Procedure

1. Switch to the Parameters 2 screen:
   

   ⇨ The following screen appears:
   

2. Enter the number of pulses per liter in the Imp. Flow line.

⇨ The number of pulses per liter input appears in the Imp. Flow line.

6.6 Calibrating the wheel sensor

- When the speed shown on the work screen is incorrect.
- When the traveled route shown on the work screen is incorrect.

NOTICE

Imprecise calibration
The speed cannot be precisely determined with an incorrectly calibrated wheel sensor.
As a result all the calculations of the area sprayed, the route traveled and the volume applied will be highly imprecise.

- Calibrate the wheel sensor very precisely.

6.6.1 Determining pulses per 100 meters

When calibrating the wheel sensor with the 100m method, you determine the number of pulses received by the sensor over a distance of 100 meters.

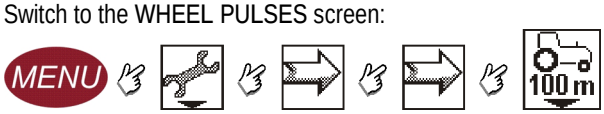
To make sure that the wheel sensor functions correctly, at least 185 pulses must be received every 100 meters.

When the number of pulses is known, Spraylight can calculate the actual speed.

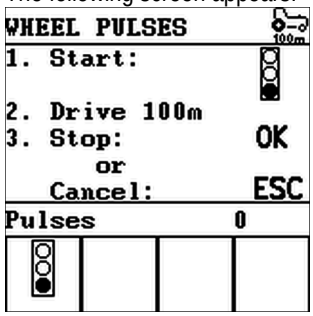
Preconditions

- ☑ Wheel sensor is mounted.
- ☑ All wheel sensor magnets are fully functional.
- ☑ A distance of 100m has been measured and marked. The distance must correspond to the field conditions. It should therefore lead over a meadow or a field.
- ☑ The tractor with connected machine is ready for a 100m drive and is at the start of the marked distance.

1. Make sure that all preconditions are fulfilled!
2. Switch to the WHEEL PULSES screen:

   ⇨ The following screen appears:

3. - Start calibration.
4. The following function icons appear:
   - Stop calibration.
   - Abort calibration.
5. Drive the previously measured 100m distance and stop at the end.
   ⇨ During the drive, the currently determined pulses are displayed.
6. - Stop calibration.
7. - Exit the screen.

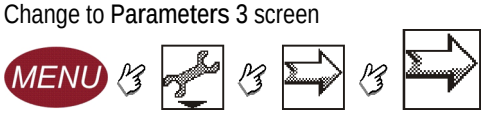
⇨ You have calibrated the wheel sensor.

6.6.2 Manually entering the number of pulses for the wheel sensor

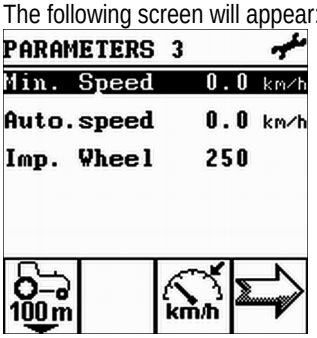
If you know the number of pulses for the wheel sensor you can enter this number manually as well.

Procedure

1. Change to Parameters 3 screen



⇨ The following screen will appear:



2. Enter the number of pulses in the Wheel.pls line.

⇨ You have manually entered the number of pulses.

6.7 Set limit values for the spray pressure

This setting defines a spray pressure range within which the spray pressure is optimal.

If the spray pressure is above or below the maximum limit values, an alarm will be triggered.

You can decide what limit values you want for yourself.

If no pressure sensor is installed on your sprayer, you must deactivate this function as follows:

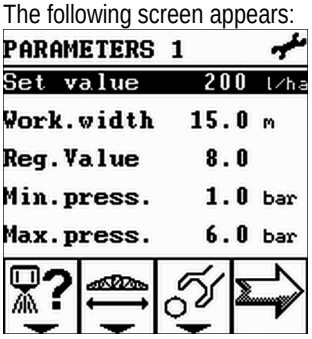
- Enter value 0 in the min. pressure line.
- Enter value 0 in the max. pressure line.

Preconditions

☑ A pressure sensor is fitted to the sprayer.

1. Make sure that all preconditions are fulfilled!
2. Switch to the Parameters 1 screen:

⇨ The following screen appears:



3. Input the minimum pressure in the Min.press. line.
4. Input the maximum pressure in the Max.press. line.

⇨ The new limit values appear in the Parameters 1 screen.

6.8 Configuring Automatic mode

Automatic mode controls the spray pressure automatically. For this, a set value must be reached.

To use automatic mode, you must configure the following parameters:

- Set value
- Reg.Value
- Working width
- Calibrate wheel sensor / pulses per 100m

6.8.1 Setting minimum working speed

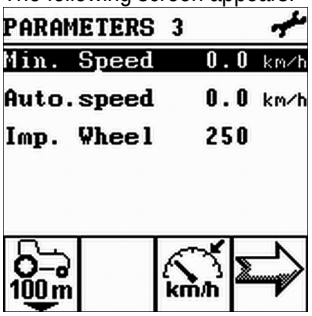
If the machine speed drops below the minimum working speed, the following happens:

- Application stops automatically.

Procedure

1. Switch to the Parameters 3 screen:

⇨ The following screen appears:



2. Enter the minimum working speed in the Min. Speed line.
   Entering 0 deactivates this function and Automatic mode.

⇨ The new value appears in the Parameters 3 screen.

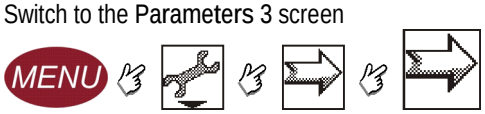
6.8.2 Setting minimum automatic working speed

If the sprayer speed drops below the minimum automatic speed, the following happens:

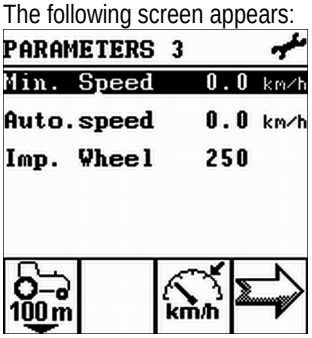
- Spray pressure regulation is switched off.

Procedure

1. Switch to the Parameters 3 screen



⇨ The following screen appears:



2. Input the minimum pressure in the Auto.speed line.

⇨ The new value appears in the Parameters 3 screen.

6.8.3 Setting the regulation value

In Automatic mode, the spray pressure of the nozzles is adapted to the current speed of the sprayer. The adjustment should ensure that the volume of spray liquid that is applied is exactly what you defined in the set value. The regulation value plays a decisive role in this.

Mode of operation

The regulation value adjusts the regulation speed:

- The higher the regulation value, the faster the spray pressure is adjusted.
- The lower the regulation value, the more slowly the spray pressure is adjusted.

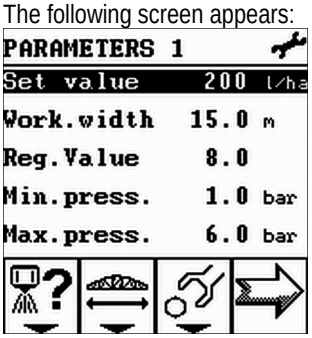
When setting the regulation value, take note of the following:

- If, during movement at constant speed, the current application volume jumps around the set value, you must reduce the regulation value.
- If, when the speed changes, the application volume does not adjust to the set value quickly enough, you must increase the regulation value.

Procedure

1. Switch to the Parameters 1 screen:

⇨ The following screen appears:



2. Input the desired regulation value in the Reg.Value line.

⇨ The new regulation value appears in the Parameters 1 screen.

6.9 Triggering hydraulic valves

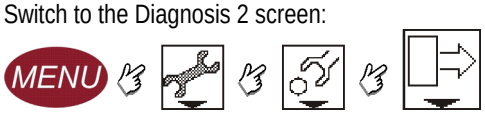
According to configuration, several hydraulic valves can be connected to your terminal. In order for these to be controlled you must assign a function button to each of the hydraulic valves.

When assigning a function button to a hydraulic valve, a function symbol for this hydraulic valve appears on the work screen.

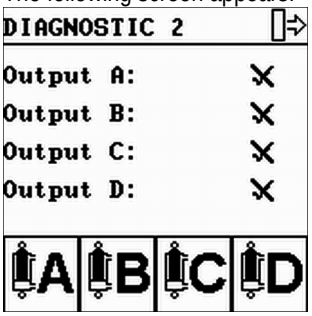
Preconditions

☑ A service technician has already activated the hydraulic valve triggering in the service area of the Spraylight.

1. Make sure that all preconditions are fulfilled!
2. Switch to the Diagnosis 2 screen:



⇨ The following screen appears:



Each output corresponds to a hydraulic valve.

3. Press the function keys to activate the desired hydraulic valves.
   Besides the names of the outputs, the following icons appear:
   ✓ - Hydraulic valve is activated.
   ✗ - Hydraulic valve is deactivated.
4. Esc - Exit the Diagnosis 2 screen.

⇨ You have activated the desired hydraulic valves.

6.10 Configuring the communication with an ISOBUS terminal

Spraylight is capable of exchanging data with an ISOBUS terminal.

Advantages:

- You can achieve site-specific metering by importing the target rates from a prescription map.
  - For Spraylight software version 02.00.10 via LH5000
  - As of Spraylight software version 02.00.13 via LH5000 or ASD
- You can control the sections automatically, e.g to prevent overlaps.

Procedure

☑ The ISOBUS terminal can provide the corresponding information through the V24 interface.

1. Configure the V24 interface [→ 55].
2. Connect Spraylight to an ISOBUS terminal. You can read how to do this in the operating instructions for the terminal.

7 Applying the device in the field

In this chapter, you will find out how you can work with the sprayer during application with the help of the Spraylight.

7.1 Entering the set value

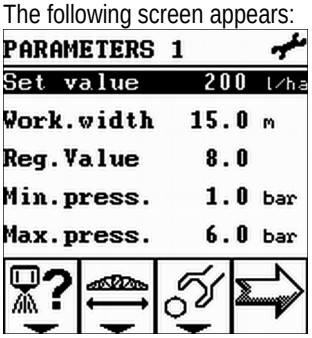
The set value is the amount of spray liquid you want to apply per hectare.

You must enter this set value in order to enable Spraylight to control application automatically.

Procedure

1. Switch to the Parameters 1 screen:

⇨ The following screen appears:



2. Enter the application amount in the Set value line.

⇨ The set value entered appears in brackets on the work screen.

7.2 Controlling application

Spraylight lets you work in two modes:

- in automatic mode
- in manual mode

Controls

Switching between manual and automatic mode

7.2.1 Using Automatic mode

In Automatic mode, Spraylight controls the spray pressure and the sections' main switch so the set value is reached.

You are in automatic mode when one of the following icons appears in the work screen:

Icon on the work screen	Meaning
	Sprayer can apply. The spray pressure will be regulated so that the set value is achieved.
	The speed of the sprayer is below Auto.speed. Sprayer can apply. Spray pressure is not regulated.

Icon on the work screen	Meaning
	The speed of the sprayer is below Min. Speed. Sprayer switches off automatically.

Mode of operation

The spray pressure will be adjusted automatically in the following cases:

- Speed of the sprayer has changed.
- The number of selected sections has changed.
- You have changed the set value manually.

The speed and precision with which the set value will be adjusted depends on the value of the Reg.Value parameter.

You can change the set value manually while driving in Automatic mode.

Preconditions

- Set value has been entered
- Flow meter is calibrated
- Wheel sensor is calibrated
- Working width is set
- The speed of the sprayer is higher than the set Auto.speed.
- The Reg.Value parameter has been set.

Controls

Increase the set value by 10%

Reduce the set value by 10%

Set the set value to 100%

7.2.2 Using Manual mode

You are in Manual mode if the icon appears on the work screen.

In manual mode, you must control the spray pressure yourself.

You can read the current spray pressure on the work screen.

Controls

Manually increase the spray pressure

Manually decrease the spray pressure

7.2.3 Starting application

Preconditions

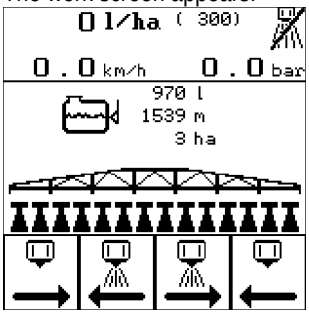
☑ The tractor with the sprayer is on the field.

☑ Spraylight is configured.

☑ The spray boom is folded out.

1. Make sure that all preconditions are fulfilled!
2. - Switch on Spraylight.

⇨ The work screen appears:



3. - Start application.
   ⇨ The sprayer is ready for application. Because the sprayer is not moving, the icon appears on the work screen.
4. Drive off and exceed the minimum Autospeed.
   ⇨ As soon as you exceed the minimum Autospeed, the sprayer will begin application. During application, the icon appears on the work screen.

⇨ You have started application.

7.2.4 Stopping application

You can stop application in the following ways:

- - stop application.
- - switch off all sections.
- Move slower than the set minimum speed.

7.3 Switching off sections

Sections can only be switched off inwards from the outermost section.

Controls

	Switch off sections from left to right
	Switch off sections from right to left

Pressing a function key several times switches off a section each time.

7.4 Selecting sections

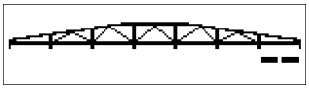
Controls

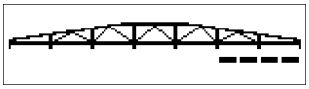
	Switch on sections from left to right
	Switch on sections from right to left

7.5 Selecting sections when all sections are switched off

Procedure

1. - Select a section on the far right.
   ⇨ The icon for a selected section appears on the right side of the boom display:



2. - Switch on further sections from right to left.
   ⇨ A further section is selected:
   
3. Proceed until the desired number of sections is selected.

7.6 Working in localized mode

"Localized mode" is designed for the targeted treatment of small weed infestations.

In contrast to normal mode, in localized mode you can switch individual sections on and off, even when they are not adjacent to one another.

7.6.1 Work screen in localized mode

The work screen in localized mode differs slightly from the normal work screen.

- In the boom display a cursor bar appears below the boom:

- Three function icons appear in the function icons area for operating the sections.

7.6.2 Selecting and switching off sections in localized mode

Regardless of whether the sprayer is applying, you can move the cursor bar below any section and change the section's state.

Controls

Move cursor bar to the left

Move cursor bar to the right

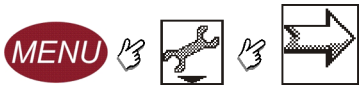
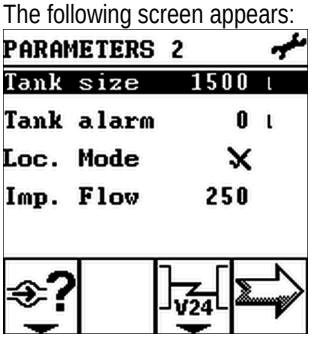
Select or switch off a marked section

When certain sections are selected, application then starts on these sections

When no sections are selected, application then starts on all sections

7.6.3 Activating localized mode

Procedure

1. Switch to the Parameters 2 screen:
   
   ⇨ The following screen appears:
   

2. - Highlight the Loc. Mode line.
3. - Activate Localized mode.
4. The icon appears alongside the Loc. Mode parameter.

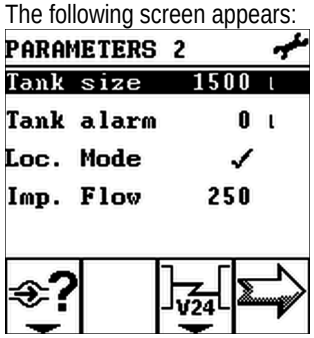
⇨ Localized mode is activated.

7.6.4 Deactivating localized mode

Procedure

1. Switch to the Parameters 2 screen:

⇨ The following screen appears:



2. - Highlight the Loc. Mode line.
3. - Deactivate Localized mode.

⇨ The icon appears alongside the Loc. Mode parameter. Localized mode is deactivated.

⇨ Normal mode is activated again.

7.7 Documenting work results

You can document and evaluate the work results on two screens:

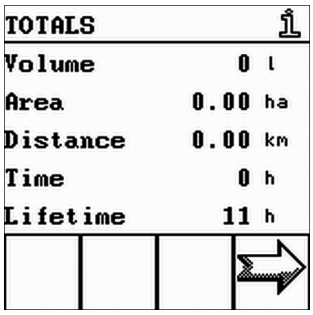
- Screen Totals
- Screen Daily counter

Both screens contain the following information:

- Volume – applied volume.
- Area – area processed.
- Distance – distance driven during the application.
- Time – Total application time.

7.7.1 The Totals screen

The total counter automatically documents all work results since the initial commissioning of the Spraylight.



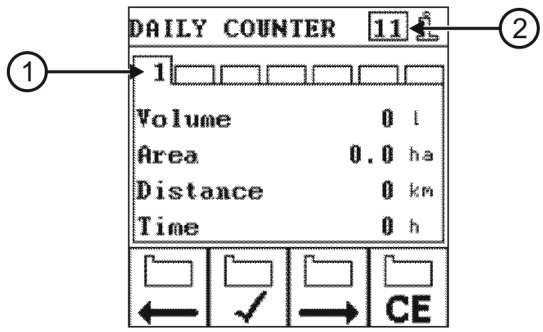
The Totals screen

Path

7.7.2 The Daily counter screen

DAILY COUNTER – document the work results within the period since the daily counter was activated until another daily counter is activated.

Spraylight has 20 daily counters.



Daily counter

1	Displayed daily counter Number of daily counters whose results are displayed.	2	Activated daily counter Number of daily counters which are documenting the current work.

Path

Controls

Show previous daily counter

Show next daily counter

Activate daily counter shown

Delete the contents of the daily counter shown

7.7.3 Documenting work results with a daily counter

Mode of operation

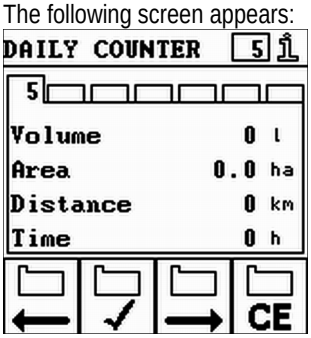
All work you carry out is documented by the active daily counter.

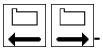
You can change the number of the active daily counter manually. If you do not change the number of the active daily counter, Spraylight sets the counter to continue counting on the next day.

Procedure

1. Switch to the Daily counter screen:

⇨ The following screen appears:



2.  - Select the daily counter you want to activate.
3. If this daily counter already contains work results, you can:
   - Delete the contents of the daily counter shown.
4. - Activate the daily counter shown.
   ⇨ The number of the activated daily counter changes in the header.
5. Start work.

After work:

1. Note the documented work results.
2. Activate a daily counter again before the next deployment.

7.8 Working with hydraulic valves

Hydraulic valves allow additional machines and functions to be connected to the sprayer.

If you connect hydraulic valves to the Spraylight and configure them, you can control the connected devices with the help of the Spraylight.

⚠ WARNING

Risk of injury

Actuating a hydraulic valve can cause connected machines and machinery components to move. This may cause danger for you and for persons in direct proximity to the machine.

- Familiarize yourself with the machine functions which are triggered by the valves.
- Read the warning notices in the operating instructions for the machines connected to the hydraulic valve before actuating a hydraulic valve!
- Follow the instructions in the operating instructions for the machines connected to the hydraulic valves!

Controls

Select the Hydraulic valves function key group on the work screen.

The function keys for working with the hydraulic valves can be configured as follows:

- as switches
- as keys

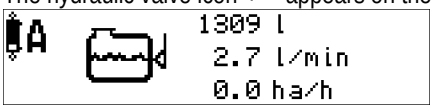
These are configured in a password-protected area and this can only be done by a service technician.

7.8.1 Controlling hydraulic valves configured as keys

Hydraulic valves which have been configured as keys are only activated when the function key is actuated.

Activating the hydraulic valve

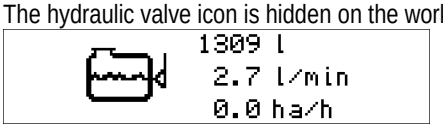
1. Press and hold the function key for the desired valve.
   ⇨ The hydraulic valve icon A appears on the work screen.



⇨ The hydraulic valve is activated for as long as the function key remains pressed.

Deactivating the hydraulic valve

1. Release the function key
   ⇨ The hydraulic valve icon is hidden on the work screen.



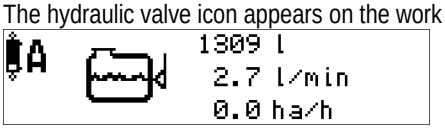
⇨ The hydraulic valve is deactivated.

7.8.2 Controlling hydraulic valves configured as switches

Hydraulic valves which are configured as switches remain active until they are switched off.

Activating the hydraulic valve

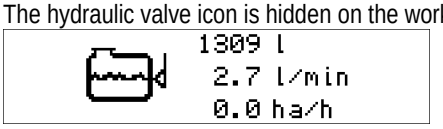
1. Press the function key of the desired valve.
   ⇨ The hydraulic valve icon appears on the work screen.



⇨ The hydraulic valve is activated.

Deactivating the hydraulic valve

1. Press the function key
   ⇨ The hydraulic valve icon is hidden on the work screen.



⇨ The hydraulic valve is deactivated.

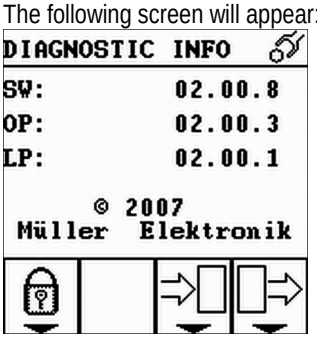
8 Maintenance and servicing

8.1 Checking the software version

Procedure

1. Change to Diagnostic Info screen

⇨ The following screen will appear:



⇨ The following information may appear on the screen:

- SW: Software version
- OP: "Object Pools" version (icons and graphics)
- LP: "Language Pools" version (texts in all languages)

8.2 V24 interface

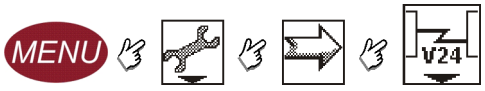
The V24 interface serve to establish the communication between Spraylight and a connected device.

One of the following parameters can be activated on the V24 screen:

- SW update: Setting for software updates with the DataBox 2
- Hardcopy: here, Müller-Elektronik can load data from Spraylight.
- LH5000: The set value is accepted by the LH5000 and the currently applied amount is restored.
- ASD: If this parameter is activated, Spraylight can communicate with an ME terminal through the serial interface. You can find more information on this in the description of the serial interface in the terminal operating instructions. In this way, the following functions are possible:
  - Section control via SECTION-Control
  - Target rate import from a prescription map
- ASD SC: If this parameter is activated, Spraylight can communicate with an ME terminal through the serial interface. In this way, the following functions are possible:
  - Section control via SECTION-Control

Procedure

1. Switch to V24 screen:



2. Activate the desired parameters.

8.3 Activating simulated speed function

The simulated speed function is only used by the Spraylight during tests. It simulates the movement of the machine when the machine is at a standstill.

By activating simulated speed, it is possible for customer service employees to check the correct function of a sensor.

By default the value is set to 0 km/h and the function is switched off.

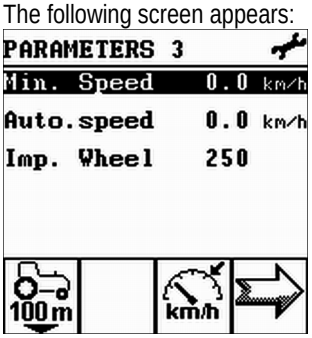
After restarting the computer, the simulation is always deactivated.

The most recently set value is saved and used during the next activation.

Procedure

1. Switch to the Parameters 3 screen:

⇨ The following screen appears:



2. Check whether the Sim.speed. line is present:
   YES – simulated speed is activated.
   NO – simulated speed is deactivated.
3.

- Activate screen to input simulated speed data.
   ⇨ The data input screen appears.
4. Input the simulated speed.
   You can input any value, up to 99.9 km/h.
5.

- Confirm.
   ⇨ The new Sim.speed parameter appears in the Parameters 3 screen.

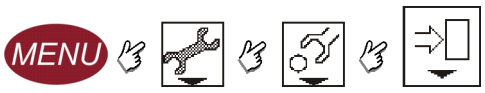
8.4 Displaying sensor status

The screens in this area contain information that is mainly of interest for customer service.

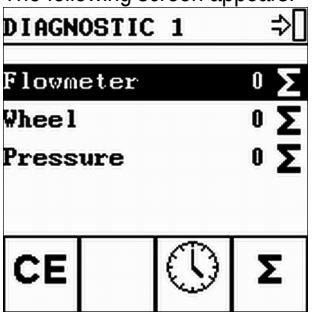
ou can read out the condition of sensors in the Diagnosis 1 screen.

Procedure

1. Switch to the DIAGNOSTIC 1 screen:



⇨ The following screen appears:



In each of the lines of the screen you will find:
- The name of the sensor

- Current value of the sensor/counter
- Unit in which the sensor value is displayed

⇨ Depending on the system's configuration, different sensors may be displayed here:
Flowmeter – Flow meter
Wheel – Wheel sensor
Pressure – Pressure sensor
Tank – Tank-Control

2. You can decide for yourself what unit to use to display the sensor value by pressing the function keys.
3. You can also reset the sensor value to 0.

Controls

	Display the sensor value in pulses per minute
Σ	Display the sensor value as the total no. of pulses
CE	Reset the sensor value to 0

8.5 Maintaining and cleaning device

- Only clean Spraylight with a soft damp cloth wet with clear water or glass cleaner.

8.6 Disposing of the unit

When it has reached the end of its service life, please dispose of this product as electronic scrap in accordance with applicable EU legislation.

8.7 Technical specifications

Parameter	Value
Operating voltage	10 - 30 V
Operating temperature	-20 – +70 °C
Storage temperature	-30 – +80 °C
Weight	1 kg
Dimensions (W x H x D)	170 x 165 x 90 mm
Protection class	IP 54 in accordance with DIN 40050/15
EMC	In accordance with ISO 14982 / PREN 55025 Interference suppression level 4
ESD protection	In accordance with ISO 10605 Level 3
Power input	5 Watt

Parameter	Value
Display	160 x 160 pixel LCD display, transflective with white LED backlighting; software-controlled contrast, brightness and temperature compensation
Processor	60 MHz ARM7 LPC2214 with internal 256k flash disk and 16k RAM
RAM	1 MB
Boot USB	2MB
Serial FRAM	8kB
Real Time Clock	Buffered by capacitor, keeps the time for more than 2 weeks without an external power supply.
Keyboard	14 keys plus On/off key, all backlit
Outputs	4 high-side switches with current measurement, 3.5A. 8 full bridges with current measurement max. 1.5 A per bridge and 1x 5A Due to input protection, overall power consumption should not exceed 10A.

8.8 Plug assignment - 8-pole flange socket

These abbreviations are used in the following table:

- VE – Electronics voltage
- VL – Power voltage

8-pole flange socket Pin no.	Signal	8-pole flange socket Pin no.	Signal
1	Wheel sensor	5	Working position
2	+12 VE	6	Radar
3	0 VE	7	RS232 RxD
4	PTO	8	RS232 TxD

8.9 Plug assignment - 39-pole clip connector

These abbreviations are used in the following table:

- VE – Electronics voltage
- VL – Power voltage
- A – Series A
- B – Series B

- C – Series C

39-pole connector Pin no.:	Signal	39-pole connector Pin no.:	Signal	39-pole connector Pin no.:	Signal
A1	Regulation	B1	Section-5 B	C1	Hydraulic A or PWM fan –Caffini
A2	Regulation	B2	Section-6 A	C2	Hydraulic B
A3	Bypass	B3	Section-6 B	C3	Hydraulic C
A4	Bypass	B4	Section-7 A	C4	Hydraulic D
A5	Section-1 A	B5	Section-7 B	C5	Circulation valve
A6	Section-1 B	B6	12 VL	C6	free
A7	Section-2 A	B7	12 VL	C7	12 VE
A8	Section-2 B	B8	12 VL	C8	Flow meter
A9	Section-3 A	B9	12 VL	C9	0 VE
A10	Section-3 B	B10	0 VL	C10	Wheel sensor
A11	Section-4 A	B11	0 VL	C11	Pressure sensor (analog)
A12	Section-4 B	B12	0 VL	C12	Tank Control
A13	Section-5 A	B13	0 VL	C13	Pressure sensor (digital) or PWM fan sensor – Caffini

Ports C4 and C5 are bridged.

9 Troubleshooting

9.1 Table of potential faults

Fault description	Possible cause	Help
The device does not switch on	Incorrect power supply polarity	Check the battery connector cable.
	Interruption in the power supply.	Check the battery and fuse terminals.
	Total failure	Send in the device
No speed is displayed	Missing pulse/100m input	Input number of pulses/100m
	The wheel sensor does not send any pulses to the computer.	Set the distance between the wheel sensor and the magnet at 5-10 mm.
		The red site of the magnet must face the sensor.
		Sensor is faulty, replace
No surface is shown	Working width entry is missing	Input working width